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(Rel.79-4/99 Pub.605)

FORM 17-1

17-3

01/25/00

Practitioner's Docket No. 2137/104

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Date: 1-25-00Assistant Commissioner for Patents
Washington, D.C. 20231jc135 U.S. PTO
09/491032
01/25/00

REISSUE APPLICATION TRANSMITTAL

Transmitted herewith is the application for reissue of U.S.

☒ Utility Patent ☐ Plant Patent ☐ Design PatentNo. 5,936,660 issued on August 10, 1999

Inventor(s): Gurantz

Title: DIGITAL VIDEO CONVERTER BOX FOR SUBSCRIBER/HOME WITH MULTIPLE TELEVISION

Enclosed are the following: SETS

1. Specification, claim(s) and drawing(s) (37 C.F.R. § 1.173)

(a) ☒ 7 page(s) of specification☒ 13 page(s) of claims☒ 1 page(s) of abstract

NOTE: This must include the entire specification and claims of the patent, with the matter to be omitted by reissue enclosed in square brackets. Any additions made by the reissue must be underlined, so that the old and new specifications and claims may be readily compared. Claims should not be renumbered. The numbering of claims added by reissue should follow the number of the highest numbered patent claim. No new matter shall be introduced into the specification. (37 C.F.R. § 1.173).

CERTIFICATION UNDER 37 C.F.R. § 1.10*

(Express Mail label number is mandatory.)

(Express Mail certification is optional.)

I hereby certify that this Reissue Application Transmittal and the documents referred to as enclosed therein are being deposited with the United States Postal Service on this date 1-25-00, in an envelope as "Express Mail Post Office to Addressee," mailing Label Number EL361717455US, addressed to the: Assistant Commissioner for Patents, Washington, D.C. 20231.

Steven G. Saunders

(type or print name of person mailing paper)

Signature of person mailing paper

WARNING: Certificate of mailing (first class) or facsimile transmission procedures of 37 C.F.R. § 1.8 cannot be used to obtain a date of mailing or transmission for this correspondence.

***WARNING:** Each paper or fee filed by "Express Mail" must have the number of the "Express Mail" mailing label placed thereon prior to mailing. 37 C.F.R. § 1.10(b).

"Since the filing of correspondence under § 1.10 without the Express Mail mailing label thereon is an oversight that can be avoided by the exercise of reasonable care, requests for waiver of this requirement will **not** be granted on petition." Notice of Oct. 24, 1996, 60 Fed. Reg. 56,439, at 56,442.

(Reissue Application Transmittal [17-1]—page 1 of 6)

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(b) ☐ _____ sheet(s) of drawing (drawings amended)

☐ Formal

☐ Informal

NOTE: "Amendments which can be made in a reissue drawing, that is, changes from the drawing of the patent, are restricted." 37 C.F.R. § 1.174(b).

☒ No changes in the drawings, upon which the original patent was issued, are to be made. Therefore, in accordance with 37 C.F.R. § 1.174(a), please find attached, in the size required for original drawings:

☒ a copy of the printed drawings of the patent.

☐ a photoprint of the original drawings.

☐ A letter requesting transfer of the drawings from the original patent file to this reissue application is attached.

2. Declaration and power of attorney

☒ 2 pages of declaration and power of attorney

3. Preliminary amendment

(check, if applicable)

☐ Attached

4. Offer to surrender the original letters patent in accordance with 37 C.F.R. § 1.178 is attached.

☒ Offer to surrender is by the inventor

☒ along with assent of assignee.

☐ Offer to surrender is by the assignee of the entire interest (and the reissue application does not seek to enlarge the claims of the original patent).

5. Letters patent

☐ Original letters patent are attached.

☐ Declaration that original letters patent lost or inaccessible is attached.

☒ A copy of the original printed patent is attached.

NOTE: "The application may be accepted for examination in the absence of the original patent or the declaration but one or the other must be supplied before the case is allowed." 37 C.F.R. § 1.178.

NOTE: "Where the original patent grant is not submitted with the reissue application as filed, patentee should include a copy of the printed original patent. Presence of a copy of the original patent is useful for the calculation of the reissue filing fee and for the verification of other identifying data." M.P.E.P., § 1416, 7th ed.

NOTE: "If a reissue be refused, the original patent will be returned to applicant upon his request." 37 C.F.R. § 1.178.

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6. Petition to proceed without assignee's assent

- ☐ Attached hereto is a "PETITION TO PROCEED WITH REISSUE APPLICATION WITHOUT ASSIGNEE'S ASSENT".

A. ☐ The fee payment is authorized in the attached:

- ☐ "REISSUE APPLICATION TRANSMITTAL" Form
☐ "COMPLETION OF FILING REQUIREMENTS — REISSUE APPLICATION" Form.

B. ☐ Payment is authorized below.

7. Information Disclosure Statement

- ☐ Attached
☐ Copies of the IDS citation(s) is/are attached.

8. Priority—35 U.S.C. § 119

- ☐ Priority of application Application No. 0 / _____, filed on _____, in _____ is claimed under 35 U.S.C. § 119.
Country
- ☐ The certified copy has been filed in prior application Application No. 0 / _____ filed on _____.

9. Basic Filing Fee Calculation (37 C.F.R. § 1.16(h), (i) and (j))

CLAIMS AS FILED			
Number Filed	Number Extra	Rate	Basic Fee (37 C.F.R. 1.16(h)) \$ 690.00
Total Claims (37 C.F.R. § 1.16(i))	54 — 20 (and also in excess of total claims in patent)	=34 X \$18.00	\$612.00
Independent Claims 37 C.F.R. § 1.16(i))	8 — (number of inde- pendent claims in patent)	=5 X \$78.00	\$390.00
Filing fee Calculation			\$ 1692.00

NOTE: Multiple dependent claims are treated as ordinary claims for fee purposes. 37 C.F.R. § 1.16(j).

(Reissue Application Transmittal [17-1]—page 3 of 6)

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10. Small Entity Status (if applicable)

NOTE: A new statement is required for the reissue, even if one has been filed in the original patent. 37 C.F.R. § 1.27(a).

WARNING: "Small entity status must not be established when the person or persons signing the . . . statement can *unequivocally* make the required self-certification." M.P.E.P. § 509.03, 6th ed., rev. 2, July 1996 (emphasis added).

☐ A statement that this filing is by a small entity is
☐ attached.

Filing Fee Calculation (50% of above) \$ _____

NOTE: If a statement is filed within 2 months of the date of timely payment of a fee, then the excess fee paid will be refunded on request. 37 C.F.R. § 1.28(a). Effective April 1, 1984.

11. Additional Fee Payments

☐ Payment is being made for "PETITION TO PROCEED WITH REISSUE APPLICATION WITHOUT ASSIGNEE"
(37 C.F.R. § 1.17(h)) \$130.00

12. Total Fees Due

Filing Fee	\$ 1692.00
Petition fee	\$ _____
Total Fees Due	\$ 1692.00

13. Method Of Payment of Fees

☒ Enclosed is a check in the amount of \$ 1692.00 .
☒ Charge Account No. 19-4972 in the amount of \$ any deficiencies
A duplicate of this request is attached.

NOTE: Fees should be itemized in such a manner that it is clear for which purpose the fees are paid. 37 C.F.R. § 1.22(b).

14. Authorization To Charge Additional Fees

WARNING: If no fees are to be paid on filing, the following items should not be completed.

WARNING: Accurately count claims, especially multiple dependent claims, to avoid unexpected high charges, if extra claim charges are authorized.

- ☐ The Commissioner is hereby authorized to charge the following additional fees by this paper and during the entire pendency of this application to Account No. _____ :

☐ 37 C.F.R. § 1.16(a), (f) or (g) (filing fees)

☐ 37 C.F.R. § 1.16(b), (c) and (d) (presentation of extra claims)

NOTE: Because additional fees for excess or multiple dependent claims not paid on filing or on later presentation must only be paid or these claims cancelled by amendment prior to the expiration of the time period set for response by the PTO in any notice of fee deficiency (37 C.F.R. § 1.16(d)), it might be best not to authorize the PTO to charge additional claim fees, except possibly when dealing with amendments after final action.

☐ 37 C.F.R. § 1.16(e) (surcharge for filing the basic filing fee and/or declaration on a date later than the filing date of the application)

☐ 37 C.F.R. § 1.17(a)(1)-(5) (extension fees pursuant to § 1.136(a)).

☐ 37 C.F.R. § 1.17 (application processing fees)

NOTE: "A written request may be submitted in an application that is an authorization to treat any concurrent or future reply, requiring a petition for an extension of time under this paragraph for its timely submission, as incorporating a petition for extension of time for the appropriate length of time. An authorization to charge all required fees, fees under § 1.17, or all required extension of time fees will be treated as a constructive petition for an extension of time in any concurrent or future reply requiring a petition for an extension of time under this paragraph for its timely submission. Submission of the fee set forth in § 1.17(a) will also be treated as a constructive petition for an extension of time in any concurrent reply requiring a petition for an extension of time under this paragraph for its timely submission." 37 C.F.R. § 1.136(a)(3).

NOTE: "Amounts of twenty-five dollars or less will not be returned unless specifically requested within a reasonable time, nor will the payer be notified of such amounts; amounts over twenty-five dollars may be returned by check or, if requested, by credit to a deposit account." 37 C.F.R. § 1.26(a).

☐ 37 C.F.R. § 1.18 (issue fee at or before mailing of Notice of Allowance, pursuant to 37 C.F.R. § 1.311(b))

NOTE: Where an authorization to charge the issue fee to a deposit account has been filed before the mailing of a Notice of Allowance, the issue fee will be automatically charged to the deposit account at the time of mailing the notice of allowance. 37 C.F.R. § 1.311(b).

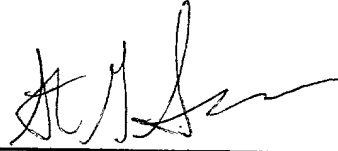
NOTE: See 37 C.F.R. § 1.28.

15. ☐ Additional Enclosures

Reg. No.: 36,265

Tel. No.: (617) 443-9292

Customer No.: 002101



SIGNATURE OF PRACTITIONER

Steven G. Saunders

(type or print name of practitioner)

Bromberg & Sunstein LLP

P.O. Address

125 Summer Street, Boston, MA 02110

ATTORNEY DOCKET 2137/104

INVENTOR: Itzhak Gurantz

REISSUE APPLICATION
SERIAL NO.: Not Yet Assigned

DATE FILED:

FOR PATENT NO.: 5,936,660

ISSUED: August 10, 1999

TITLE: DIGITAL VIDEO CONVERTER BOX FOR
SUBSCRIBER/HOME WITH MULTIPLE TELEVISION
SETS**REISSUE APPLICATION BY THE INVENTOR, OFFER TO SURRENDER**

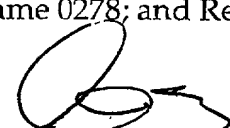
To the Commissioner of Patents and Trademarks:

The undersigned applicant of the accompanying reissue application for the reissue of letters patent for a DIGITAL VIDEO CONVERTER BOX FOR SUBSCRIBER/HOME WITH MULTIPLE TELEVISIONS SETS, Patent Number 5,936,660, granted to me on August 10, 1999, of which Conexant Systems, Inc. is now sole owner by assignment, and on whose behalf and with whose assent the accompanying application is made, hereby offers to surrender said letters patent.

Date: 1/24/00

Itzhak Gurantz

Conexant Systems, Inc., assignee of U.S. Patent No. 5,936,660, consents to the filing of the application filed herewith for the reissue of said U.S. Patent. Assignment of the invention to Conexant Systems, Inc. is recorded in the U.S. Patent and Trademark Office at Reel 009995, Frame 0278; and Reel 9182, Frame 0343.

Date: 1/21/00

Itzhak Gurantz
Vice President of Engineering
Conexant Systems, Inc.

Digital Video Converter Box for Subscriber/Home with Multiple Television Sets

Priority

This application claims priority from provisional application serial number
5 60/033,059 filed December 12, 1996, entitled "DIGITAL VIDEO CONVERTER BOX FOR
SUBSCRIBER/HOME WITH MULTIPLE TELEVISION SETS" and bearing attorney
docket number 1499/102, which is incorporated herein, in its entirety, by reference.

Background of the Invention

10 The present invention relates to digital video conversion systems, in particular, a
system for use with multiple television sets at the home of a single subscriber.

Subscription and pay-per-view video services are delivered to a subscriber's premises
via both satellite and cable transmission systems. In cable systems, 6 MHZ analog video
and/or digital QAM channels are frequency division multiplexed (FDM) across the 500 -
15 1000 MHZ cable bandwidth. In typical satellite systems, several compressed digital video
programs are time division multiplexed (TDM) into a single 10 - 40 Mbit/s QPSK or BPSK
modulated C- or K- band carrier. Several carriers may be available to subscribers over
several transponders in the satellite.

In order to select and view a program, the received broadcast signal must be tuned,
20 demodulated, and decompressed. Additionally, in the case of premium or pay-per-view
programming, authorization must be obtained for the digital data to be decrypted. In
traditional systems, these functions are placed in a set-top converter box, which RF
modulates the decompressed video for viewing on channel 3 or 4 of a standard television.

The tuning and demodulation functions of the conversion process for cable and
25 satellite systems differ because of their transmission methods. The decompression and RF
modulation of the digital video data are similar to both systems. In cable systems, the
appropriate 6 MHZ channel is tuned by mixing the received FDM signal to bring the desired
channel to an intermediate frequency (IF). The IF QAM signal is then demodulated into the
compressed digital video data. For satellite systems, the set-top converter box does not

5 monitor.

10 currently require one set-top box for each independently operating television, whereas many
televisions are simply split off the cable drop to a household subscribed to an analog system.

20 purchasers is of primary importance in a satellite or cable broadcast system. Unlike free terrestrial broadcasts which are paid by advertising sponsors, satellite and cable systems charge viewers directly for programming. Many access control systems have been deployed and were subsequently defeated. Because of arguments that any access control system can eventually be dissected and defeated, the state-of-the-art system features a "replaceable

25 security" element such as a "smartcard". The smartcard is credit-card sized, and contains an integrated circuit chip for authorizing a unique subscriber. The smartcard is inserted into the set-top box to decrypt premium programming. A smartcard may be used on a pre-paid basis, or can be inexpensively replaced in the event the existing access control system is defeated.

In addition to the cost disadvantage of requiring an individual set-top box for each television in a household, problems also arise in managing access control for a household. For example, additional televisions in the home of an analog cable subscriber are often charged only a nominal fee, based on a multiple-license discount. However, in a digital transmission system with individual set-top boxes per television, a system operator could not offer such a discount since the smartcards could be moved to other homes. At the time of this invention, this necessity to pay for each individually operating set in a household remains a disadvantage of digital systems compared to analog systems.

10

Summary of the Invention

Embodiments of the present invention provide a more efficient, single digital video converter box for a subscriber's premises (household) to eliminate the need to use an individual set-top converter for each television in the premises.

15

According to an embodiment of the present invention, a household converter box accepts a frequency division multiplexed signal containing many channels of modulated digital video programming from either a cable drop or a satellite LNB amplifier. The converter box employs an independent tuning, demodulation, and video decompression chain for each independently operating television set in the house, but shares a common conditional access circuit, remote control receiver, power supply and chassis.

20

In further accordance with an embodiment of the present invention, each individual tuning, demodulation, and video decompression chain may be housed as a modular unit which plugs into the main chassis. The individual modules provide a digital output to the conditional access unit for decryption, and a digital input for decompression of the decrypted data stream. Where television sets contain built-in decompression ability (e.g., MPEG-2 decoding ability) and accept digital inputs, a form of the present invention does not decompress and RF modulate the digital program data, but outputs the digital data directly.

25

In further accordance with an embodiment of the present invention, the household video decoder box will contain a single remote control receiver which accepts commands from the various remote control transmitters associated with each television on the

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subscriber's premises. A single remote control receiver, as opposed to individual receivers in individual set-top boxes reduces costs per television set on a subscriber's premises. Since the remote control receiver can be separated from each transmitter by one or more walls, infrared or other line-of-sight modulation schemes cannot be used, but an RF band is used in the
5 present invention.

In further accordance with an embodiment of the present invention, the output of the conversion box to the individually operating television sets can be over a number of media, including a wireless RF link. For example, an RF modulated analog video signal on channel 3 or 4 may be carried from the household conversion box to the individual television sets
10 over separate coax links. Similarly, direct baseband digital data from the converter box may be carried to the individual sets over twisted wire pair links. Additionally, the selected video program may be transmitted to the individual television sets over a local, low-power wireless RF link, in analog or digital form.

The present invention is advantageously able to operate multiple televisions in a
15 subscriber's premises through the same conditional access device. Prior to this invention, each television subscribed to a digital video transmission system required its own set-top box, and because of replaceable security, it's own smartcard. This arrangement makes it difficult for a digital video service to allow a household multiple-set discount, common in analog cable services, because smartcards could be easily moved to other households. The present
20 invention allows the use of a single smartcard for a subscriber, and enables a digital video service provider to competitively offer a multiple set household discount.

The following benefits are obtained from the present invention: (1) a reduced cost per television set in a household viewing digital video transmissions, (2) a secure method of identifying all of a subscriber's digital video television decoders through a single conditional
25 access unit, and (3) a simpler method of decoding digital television transmissions for a single subscriber premises, or household.

Brief Description of the Drawings

Figure 1 is a block diagram of a prior art configuration for providing digital video to

multiple television sets in a single household.

Figure 2 is a block diagram of a configuration of the present invention for providing digital video to multiple television sets in a single household.

Figure 3 is a block diagram of a household digital converter of an embodiment of the present invention.

Detailed Discussion of the Presently Preferred Embodiments

In the prior art, a single household could use an individual digital video decoder set-top box 10 for each independently operating television set 12, as in Figure 1. As used herein, a television set may be any video signal display device including conventional televisions and computer monitors. Each set-top box 10 has a remote control 14 associated with it. The signals into the household are split by splitter 16 for delivery to each of the set-top boxes 10. In addition to a constant cost per television in the household, each set-top would probably be authorized as an individual subscriber, independent of one another. Each set-top 10 would have it's own conditional access unit, and as systems often use such replaceable security elements, it's own smartcard.

The present invention allows the use of a single converter box for cable or satellite pay-per-view and/or subscription digital video system, using a single conditional access unit (smartcard). A typical example of this single household digital video converter box 100 is shown in Figure 2, for three television sets 12 in the home. Each television set has a remote control 18 associated with it for communication with the converter box 100.

A block diagram of the household digital video converter box 100 is shown in Figure 3. For serving a plurality of television sets, the converter box includes a plurality of chains, each including a tuner 102, a demodulator 104, a decompression unit 110 and an RF video modulation unit 108. The chains share a single conditional access unit 110 and one or more remote control receivers 112 for all household sets, and a single power supply 114 and chassis. The input to the converter box provides the television signals. Current examples of such inputs include a cable drop with 6 MHZ QAM channels FDM'ed (frequency division multiplexed) over the 500 - 1000 MHZ bandwidth, or an L-band FDM signal of a number of

10 - 40 MHZ QPSK/BPSK satellite channels from an LNB. The conditional access unit 110 operates with a single smartcard 116.

The FDM signal from the cable drop or LNB is power split in the converter box, and fed to the individual tuner/demodulator/decompression/modulator units. The individual
5 converter units are modularly inserted into the main chassis in the preferred embodiment. This modularity allows the subscriber to purchase only the amount of hardware required for his household. In other embodiments, a fixed number of tuner/demodulator/decompression/modulator units may be configured. The converter units accept commands from the remote control receiver 112 to tune a desired FDM channel. The
10 selected channel is demodulated from the QAM or QPSK/BPSK signals in a cable or satellite converter box, respectively, into digital data to be decrypted by the conditional access unit 110. The conditional access unit outputs the decrypted digital data on a baseband video signal. The decrypted digital data is then input back into the units to be decompressed according to predetermined algorithms (e.g., as an MPEG-2 stream). The decompressed
15 video is then modulated into an RF analog signal viewed on a standard television set typically on channel 3 or 4. The RF signals from the decoder box to the individual television sets are carried on separate coaxial cable segments. In configurations where television sets have built-in decompression ability and accept direct digital video data, the modular units contain only tuner and demodulation functions, and baseband digital data is output from the converter to
20 the televisions in the subscriber's home. In the latter embodiment, the baseband digital data may be carried from the converter box to the individual television sets over twisted wire pair, coax, or wireless RF means.

In the preferred embodiment, a single RF remote control receiver services individual remote control transmitters associated with the independently operating televisions in the
25 household. The remote control transmitters 18 use the RF band, as opposed to infrared, because a (reflected) line-of-sight is not always available to the single decoder box.

Of course, it should be understood that various changes and modifications to the preferred embodiments described above will be apparent to those skilled in the art. For example, a less efficient implementation of the invention may be configured with a plurality

of remote control receivers, one for each chain of converter units. Also, the system of the invention is applicable regardless of the content of the signals being processed. The signals may include broadcast television programs, cable programs, interactive games, computer data, etc. for display on a television or monitor. These and other changes can be made

5 without departing from the spirit and scope of the invention and without diminishing its attendant advantages. It is therefore intended that such changes and modifications be covered by the following claims.

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I Claim:

1. A digital video conversion system comprising:
a chassis having a plurality of outputs, each output being adapted to provide a
5 decrypted television signal for delivery to an individual television set;
a plurality of converter chains housed within said chassis, each chain including at least
a tuner and a demodulator;
at least one conditional access unit, housed within said chassis, connected to said
plurality of converter chains and having an authorization input, for decrypting digital
10 demodulated signals from said plurality of converter chains upon receiving an authorized
input through the authorization input; and
at least one remote control receiver unit, housed within said chassis, responsive to
commands from individual remote controls associated with the individual television sets for
controlling said converter chains and said at least one conditional access unit.
15
2. The digital video conversion system of claim 1 wherein said at least one
conditional access unit comprises only a single conditional access unit connected to said
plurality of converter chains.
- 20 3. The digital video conversion system of claim 2 wherein the authorized input
for enabling said single conditional access unit with respect to demodulated signals from any
of the converter chains comprises a single smartcard.
4. The digital video conversion system of claim 2 wherein said at least one
25 remote control receiver unit is a single RF remote control receiver responsive to any of the
individual remote controls.
5. The digital video conversion system of claim 1 wherein each of said converter
chains further includes a decompression unit for receiving decrypted signals from said at least

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one conditional access unit and an RF modulator coupled between the decompression unit and one of the outputs.

6. The digital video conversion system of claim 1 wherein the tuner and the
5 demodulator of at least one of the converter chains are each housed in individual modular units that can be plugged into said chassis.

7. A digital video conversion system connected to a cable drop, said system comprising:

10 a splitter connected to said cable drop for simultaneously generating a plurality of frequency division multiplexed 6 MHZ QAM signals;

a plurality of converter chains, each chain including at least a tuner and a demodulator for receiving one of the frequency division multiplexed 6 MHZ QAM signals;

a single conditional access unit, connected to said plurality of converter chains and
15 having an authorization input, for decrypting demodulated QAM signals from said plurality of converter chains upon receiving an authorized input through the authorization input and said single conditional access unit individually outputting a plurality of decrypted signals simultaneously, each decrypted signal being associated with one of a plurality of individual television sets; and

20 at least one remote control receiver unit responsive to commands from individual remote controls associated with the individual television sets for controlling said converter chains and said single conditional access unit.

25 8. The digital video conversion system of claim 7 wherein the authorized input for enabling said single conditional access unit with respect to demodulated QAM signals from any of the converter chains comprises a single smartcard.

9. The digital video conversion system of claim 7 wherein said at least one

remote control receiver unit is a single RF remote control receiver responsive to any of the individual remote controls.

10. The digital video conversion system of claim 7 wherein each of said converter
5 chains further includes a decompression unit for receiving one of the decrypted signals from said single conditional access unit and an RF modulator coupled between the decompression unit and a connection to one of the individual television sets.

11. The digital video conversion system of claim 7 wherein each individual
10 television set is associated with one of the converter chains and each converter chain performs the functions of:
tuning to a selected frequency division multiplexed, digitally modulated QAM video signal;
demodulating the selected digitally modulated QAM video signal;
15 providing the demodulated video signal to said single conditional access unit;
decompressing the decrypted signal from said single conditional access unit; and
modulating the decompressed video signal into an analog video signal for viewing on the associated individual television set.

12. The digital video conversion system of claim 7 further comprising a main
20 conversion box chassis which houses said splitter, said converter chains, said single conditional access unit and said at least one remote control receiver unit and wherein the tuner and the demodulator of at least one of the converter chains are each housed in individual modular units that can be plugged into the main conversion box chassis.

25

13. The digital video conversion system of claim 7 wherein each individual television set is associated with one of the converter chains and each converter chain performs the functions of:

tuning to a selected frequency division multiplexed, digitally modulated QAM video

demodulating the selected digitally modulated QAM video signal;
providing the demodulated video signal to said single conditional access unit; and
outputting the decrypted signal from said single conditional access unit to the

14. A digital video conversion system connected to a television signal source, said system comprising:

a plurality of converter chains, each chain connected to receive one of the copies of the television signals and including at least a tuner for tuning to a selected digitally modulated video channel and a demodulator for demodulating digital video data on the selected video channel;

at least one remote control receiver unit responsive to commands from individual remote controls associated with the individual television sets for controlling said converter chains and said single conditional access unit.

16. The digital video conversion system of claim 14 wherein the authorized input

for enabling said single conditional access unit to decrypt demodulated digital video data comprises a smartcard.

17. The digital video conversion system of claim 14 wherein said at least one
5 remote control receiver unit is a single RF remote control receiver responsive to any of the
individual remote controls.

18. The digital video conversion system of claim 14 wherein each of said
converter chains further includes a decompression unit for receiving one of the decrypted
10 baseband video signals from said single conditional access unit and an RF modulator coupled
between the decompression unit and a connection to one of the individual television sets.

19. The digital video conversion system of claim 14 wherein each individual television set is associated with one of the converter chains and each converter chain performs the functions of:

- tuning to a selected digitally modulated video channel;
- demodulating digital video data on the selected video channel;
- providing the demodulated digital video data to said single conditional access unit;
- decompressing the decrypted baseband video signal from said single conditional access unit; and
- modulating the decompressed baseband video signal into an analog video signal for viewing on the associated individual television set.

20. The digital video conversion system of claim 14 further comprising a main
25 conversion box chassis which houses said splitter, said converter chains, said single
conditional access unit and said at least one remote control receiver unit and wherein the
tuner and the demodulator of at least one of the converter chains are each housed in
individual modular units that can be plugged into the main conversion box chassis.

21. The digital video conversion system of claim 14 wherein each individual television set is associated with one of the converter chains and each converter chain performs the functions of:

tuning to a selected digitally modulated video channel;

5 demodulating digital video data on the selected video channel;

providing the demodulated digital video data to said single conditional access unit;

and

outputting the decrypted baseband video signal from said single conditional access unit to the individual television set.

10

22. A digital video conversion system comprising:

a chassis having a plurality of outputs, each output being adapted to provide a decrypted television signal;

a plurality of converter chains within the chassis, each chain including at least a tuner

15 and a demodulator;

at least one conditional access unit, housed within the chassis, connected to the plurality of converter chains and having an authorization input, for decrypting digital demodulated signals from the plurality of converter chains upon receiving an authorized input through the authorization input; and

20 at least one remote control receiver unit, housed within the chassis, responsive to commands from at least one individual remote control, the at least one individual remote control controlling the at least one conditional access unit and at least one of the converter chains.

25 23. The digital video conversion system of claim 22 wherein the at least one conditional access unit comprises only a single conditional access unit connected to the plurality of converter chains.

24. The digital video conversion system of claim 23 wherein the authorized input for

enabling the single conditional access unit with respect to demodulated signals from any of the converter chains comprises a single smartcard.

25. The digital video conversion system of claim 23 wherein the at least one remote control receiver unit is a single RF remote control receiver responsive to the at least one individual remote control.

26. The digital video conversion system of claim 22 wherein each of the converter chains further includes a decompression unit for receiving decrypted signals from the at least one conditional access unit, and an RF modulator coupled between the decompression unit and one of the outputs.

27. The digital video conversion system of claim 22 wherein the tuner and the demodulator of at least one of the converter chains are each housed in individual modular units that can be plugged into the chassis.

28. A digital video conversion system connected to a cable drop, the system comprising:
a splitter connected to the cable drop for simultaneously generating a plurality of frequency division multiplexed 6 MHZ QAM signals;
a plurality of converter chains, each chain including at least a tuner and a demodulator for receiving one of the frequency division multiplexed 6 MHZ QAM signals;
a single conditional access unit, connected to the plurality of converter chains and having an authorization input, for decrypting demodulated QAM signals from the plurality of converter chains upon receiving an authorized input through the authorization input and the single conditional access unit individually outputting a plurality of decrypted signals simultaneously; and
at least one remote control receiver unit responsive to commands from at least one individual remote control for controlling the single conditional access unit and at least one of the converter chains.

29. The digital video conversion system of claim 28 wherein the authorized input for enabling the single conditional access unit with respect to demodulated QAM signals from any of the converter chains comprises a single smartcard.

5 30. The digital video conversion system of claim 28 wherein the at least one remote control receiver unit is a single RF remote control receiver responsive to the at least one individual remote control.

31. The digital video conversion system of claim 28 further comprising an output,
10 wherein each of the converter chains further includes a decompression unit for receiving one of the decrypted signals from the single conditional access unit, and an RF modulator coupled between the decompression unit and the output.

32. The digital video conversion system of claim 28 wherein each chain includes an
15 output to one of a plurality of individual televisions sets, each converter chain performing the functions of:

tuning to a selected frequency division multiplexed, digitally modulated QAM video signal;

demodulating the selected digitally modulated QAM video signal;

20 providing the demodulated video signal to the single conditional access unit;

decompressing the decrypted signal from the single conditional access unit; and

modulating the decompressed video signal into an analog video signal for viewing on the associated individual television set.

25 33. The digital video conversion system of claim 28 further comprising a main conversion box chassis that houses the splitter, the converter chains, the single conditional access unit and the at least one remote control receiver unit, the tuner and the demodulator of at least one of the converter chains each being housed in individual modular units that can be plugged into the main conversion box chassis.

34. The digital video conversion system of claim 28 wherein one individual television set is associated with one of the converter chains, the one converter chain performing the functions of:

- 5 tuning to a selected frequency division multiplexed, digitally modulated QAM video signal;
demodulating the selected digitally modulated QAM video signal;
providing the demodulated video signal to the single conditional access unit; and
outputting the decrypted signal from the single conditional access unit to the one individual television set.

10

35. A digital video conversion system connected to a television signal source, the system comprising:

- a splitter connected to the television signal source for simultaneously generating a plurality of copies of television signals received from the television signal source;
15 a plurality of converter chains, each chain connected to receive one of the copies of the television signals and including at least a tuner for tuning to a selected digitally modulated video channel and a demodulator for demodulating digital video data on the selected video channel;
a single conditional access unit, connected to the plurality of converter chains and
20 having an authorization input, for decrypting the demodulated digital video data from the plurality of converter chains upon receiving an authorized input through the authorization input and the single conditional access unit individually outputting a plurality of decrypted baseband video signals simultaneously, each decrypted baseband video signal being associated with one of the plurality of converter chains; and
25 at least one remote control receiver unit responsive to commands from at least one individual remote control for controlling the single conditional access unit and at least one of the converter chains.

36. The digital video conversion system of claim 35 wherein the signal source comprises

an LNB of a satellite antenna and the television signals provided by the television signal source comprise L-band frequency division multiplexed digitally modulated channels.

37. The digital video conversion system of claim 35 wherein the authorized input for enabling the single conditional access unit to decrypt demodulated digital video data comprises a smartcard.

38. The digital video conversion system of claim 35 wherein the at least one remote control receiver unit is a single RF remote control receiver responsive to the at least one individual remote control.

39. The digital video conversion system of claim 35 further comprising an output, wherein each of the converter chains further includes a decompression unit for receiving one of the decrypted baseband video signals from the single conditional access unit, and an RF modulator coupled between the decompression unit and the output.

40. The digital video conversion system of claim 35 wherein one of the converter chains has an associated television set, the one converter chain performing the functions of:
tuning to a selected digitally modulated video channel;
demodulating digital video data on the selected video channel;
providing the demodulated digital video data to the single conditional access unit;
decompressing the decrypted baseband video signal from the single conditional access unit; and
modulating the decompressed baseband video signal into an analog video signal for transmission to the associated individual television set.

41. The digital video conversion system of claim 35 further comprising a main conversion box chassis that houses the splitter, the converter chains, the single conditional access unit and the at least one remote control receiver unit and wherein the tuner and the demodulator of

at least one of the converter chains are each housed in individual modular units that can be plugged into the main conversion box chassis.

42. A digital video conversion system comprising:

5 an input that receives an input signal;
a plurality of converter chains operatively coupled with the input, each converter chain receiving the input signal, each converter chain including a tuner and a demodulator;
and

a conditional access unit coupled to each of the plurality of converter chains, the
10 conditional access unit decrypting at least one demodulated signal received from the at least one of the plurality of converter chains upon receipt of an authorized input.

43. The digital video conversion system as defined by claim 42 further comprising:

a remote control receiver unit responsive to commands from an individual remote
15 control, the individual remote control controlling the conditional access unit and at least one of the plurality of converter chains.

44. The digital video conversion system as defined by claim 42 further comprising:

a plurality of outputs, each of the plurality of outputs being associated with one of the
20 plurality of converter chains.

45. The digital video conversion system as defined by claim 42 wherein the authorized input comprises a smartcard.

25 46. The digital video conversion system as defined by claim 42 wherein the remote control receiver unit includes a RF remote control receiver that is responsive to the individual remote control.

47. The digital video conversion system as defined by claim 42 wherein each of the

converter chains further includes a decompression unit for receiving decrypted signals from the conditional access unit.

48. The digital video conversion system as defined by claim 42 wherein the input signal is a digital signal.

49. The digital video conversion system as defined by claim 42 wherein the input comprises a splitter coupled with each of the converter chains.

50. A digital video conversion system comprising:
a chassis having at least one output that provides a decrypted signal;
a plurality of converter chains, each chain including at least a tuner and a demodulator;
at least one conditional access unit connected to the plurality of converter chains, the conditional access unit decrypting digital demodulated signals from at least one of the plurality of converter chains in response to receiving an authorized input; and
at least one remote control receiver responsive to commands from at least one controller that controls the at least one conditional access unit and at least one of the converter chains.

51. The digital video conversion system of claim 50 wherein the at least one conditional access unit comprises only a single conditional access unit connected to the plurality of converter chains.

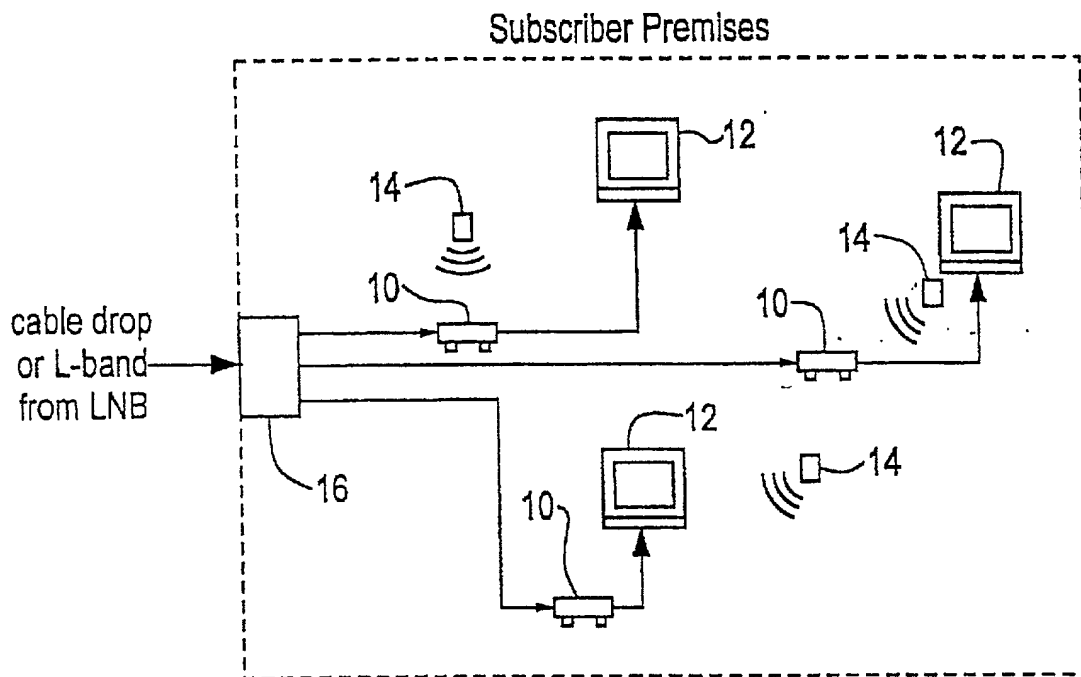
52. The digital video conversion system of claim 51 wherein the authorized input for enabling the single conditional access unit with respect to demodulated signals from any of the converter chains comprises a single smartcard.

53. The digital video conversion system of claim 50 wherein each of the converter chains

further includes a decompression unit for receiving decrypted signals from the at least one conditional access unit, and an RF modulator coupled between the decompression unit and one of the outputs.

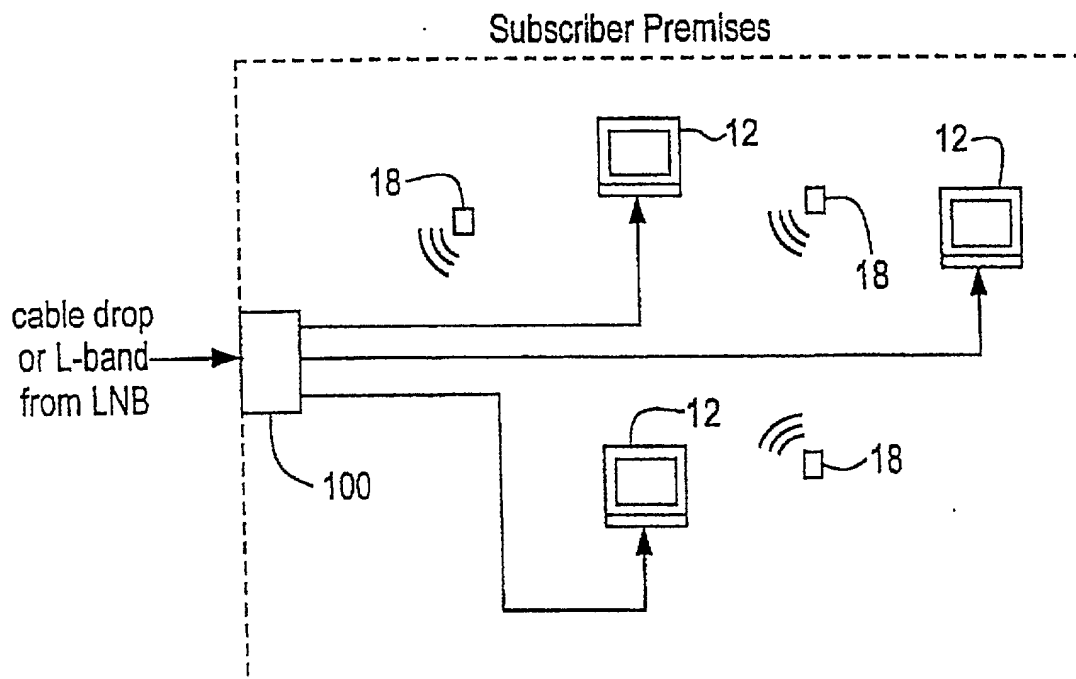
- 5 54. The digital video conversion system of claim 50 wherein the tuner and the demodulator of at least one of the converter chains are each housed in individual modular units that can be plugged into the chassis.

A digital video conversion system housing multiple converter chains of units in a single main box chassis. A preferred embodiment uses only a single conditional access unit to authorize decryption of premium channels in response to a smartcard. The conversion system allows a single converter box sharing consolidated decryption (access control) circuitry and a single remote control receiver to provide video output for multiple television sets on the subscriber's premises. In addition to reducing the subscriber's hardware costs per television set, a common access control allows the video service provider to grant a multiple-set discount on a single smartcard.

**FIG. 1**

PRIOR ART

Digital Video Configuration for Multiple Televisions in a Household

**FIG. 2**

Digital Video Configuration with Household Converter Box.

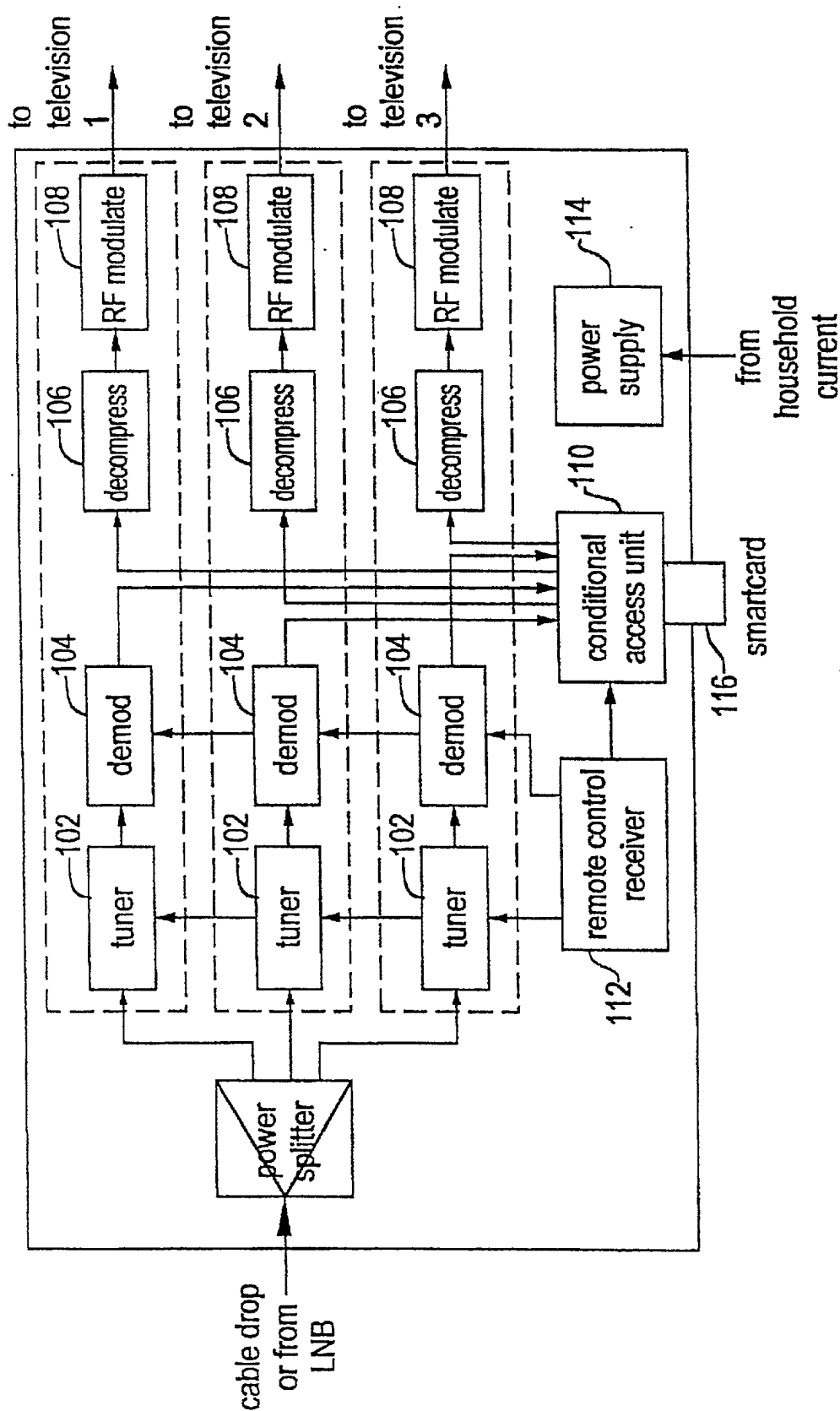


FIG. 3

Household Converter Block Diagram

PTO/SB/51 (12-97)
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REISSUE APPLICATION DECLARATION BY THE INVENTOR

Docket Number (Optional)

2137/104

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is described and claimed in patent number 5,936,660, granted August 10, 1999, and for which a reissue patent is sought on the invention entitled Digital Video Converter Box for Subscriber/Home with Multiple Television Sets the specification of which

☒ is attached hereto.

☐ was filed on _____ as reissue application number ____ / _____ and was amended on _____ (If applicable)

I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56.

I verily believe the original patent to be wholly or partly inoperative or invalid, for the reasons described below. (Check all boxes that apply.)

- ☐ by reason of a defective specification or drawing.
- ☒ by reason of the patentee claiming more or less than he had the right to claim in the patent.
- ☐ by reason of other errors.

At least one error upon which reissue is based is described as follows:

Applicants believe the original patent to be partly inoperative by reason of the patentee claiming less than patentees had the right to claim in the patent.

All errors which arose in this application up to the time of this declaration arose without any deceptive intention on the part of the applicant.

[Page 1 of 2]

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